

Emissions Reduction Fund

Draft User guide for Biomethane projects

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CONSULTATION DRAFT

Participating in the Emissions Reduction Fund

The Emissions Reduction Fund (ERF) offers landholders, communities, and businesses the opportunity to run new projects in Australia that reduce or remove greenhouse gas emissions from the atmosphere.

By running a project, you can earn Australian carbon credit units (ACCUs) and sell them to the Australian Government or to companies, State governments and other private buyers. Each carbon credit represents one tonne of carbon dioxide equivalent (CO₂-e) emissions stored or avoided.

How participating in the Emissions Reduction Fund works

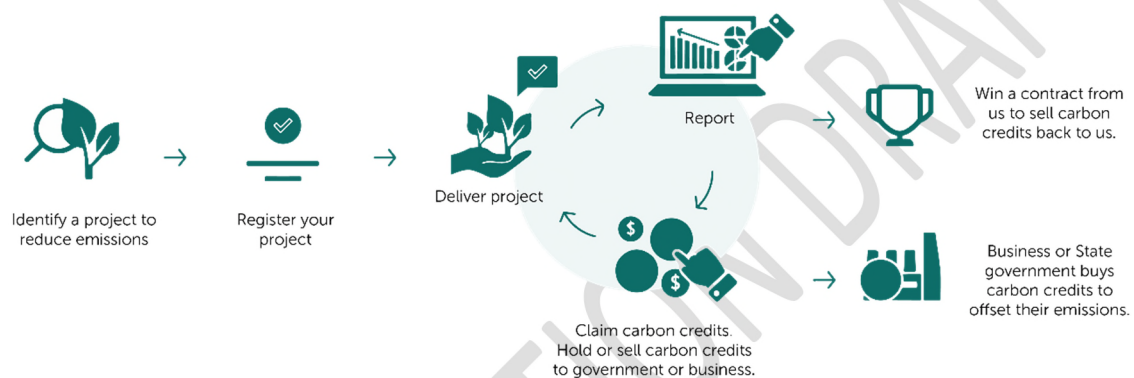






Figure 1: Emissions Reduction Fund project lifecycle

There are four general steps in running a project and participating in the Emissions Reduction Fund:

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1. Plan your project, make sure the project is eligible, and ensure you hold legal right.
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2. Register your project with the Emissions Reduction Fund.
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3. Run your project and deliver on project activities.
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4. Report on your project and claim ACCUs.

See our website¹ for more information on selling your ACCUs to the Australian Government or other interested buyers.

ERF biomethane projects

Decomposing organic matter in anaerobic (oxygen-free) environments produces a mix of methane, carbon dioxide (CO₂) and other remnant gases that are collectively known as biogas. The methane component of biogas can be refined into a substitute for (fossil fuel) natural gas called biomethane through a process known as ‘biogas upgrading’. Biomethane may then be used on-site or injected into the gas network.



What is biomethane?

Biomethane is a gas comprised almost entirely of methane – the same molecule that makes up natural gas. It can be used as a natural gas substitute.

Biomethane is produced from biogas, which itself is derived from biogenic sources such as organic solid waste or wastewater. Combustion of biomethane releases the carbon absorbed by the biogenic material from the atmosphere during its life, and on this basis is often considered to have net-zero carbon emissions. This is consistent with the approach used by the Intergovernmental Panel on Climate Change (IPCC) in guidelines for national greenhouse gas inventory reporting and accounting for bio-based energy sources.²

‘Upgrading’ is the process of refining biogas into biomethane. It involves treating biogas to remove impurities such as water, CO₂, and other remnant gases, resulting in a near-pure methane product (≥95% methane concentration). A range of upgrading technologies are commercially available, with variation in the treatment technology, capital and operation costs, and scalability.

An ERF biomethane project involves two main activities:

1. **Biogas generation**, which involves capturing biogas from waste at facilities such as landfills, wastewater treatment or animal effluent treatment plants, and upgrading the biogas into biomethane.
2. **Biomethane production**, which involves receiving and upgrading waste biogas to produce biomethane that is used in a manner where it can reasonably be expected to be combusted within Australia (for example, it is injected into a gas distribution pipeline or burned on-site for heat).

An ERF biomethane project can earn ACCUs by undertaking these activities to produce biomethane and generate abatement. Projects that undertake these activities are collectively referred to as ‘biomethane projects’ in this document.

¹ <http://www.cleanenergyregulator.gov.au/ERF/Want-to-participate-in-the-Emissions-Reduction-Fund/Step-2-Contracts-and-auctions/bidding-at-an-auction>

² Intergovernmental Panel on Climate Change, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, [Publications - IPCC-TFI \(iges.or.jp\)](http://www.iges.or.jp/publications/ipcc_tfi); Intergovernmental Panel on Climate Change 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste Sector, [Publications - IPCC-TFI \(iges.or.jp\)](http://www.iges.or.jp/publications/ipcc_tfi)

Proposed biomethane method package

The proposed biomethane method package builds on the framework of existing ERF waste methods:

- **Landfill gas (electricity generation)** method, which covers ERF projects that aim to reduce emissions of greenhouse gases by collecting and combusting landfill gas from a landfill.
- **Wastewater treatment** method, which covers ERF projects that install anaerobic digesters to replace open anaerobic lagoons in the treatment of domestic, commercial, or industrial wastewater.
- **Animal effluent** method, which covers ERF projects that treat animal effluent from piggeries, dairies, or other organic wastes that would otherwise have been treated in an anerobic pond.

Under the current ERF waste methods, methane from waste can either be flared or combusted in an engine to generate electricity. The proposed biomethane method package adds biogas generation and biomethane production as new eligible project activities across the ERF waste methods mentioned above, expanding opportunities for the waste sector to participate in the scheme.

Feedback on whether variations to enable biomethane projects under the Alternative waste treatment method and the Source separated organic waste method is sought.

Biomethane commercial considerations



The decision to capture and inject or use biomethane is a commercial decision made on a case-by-case basis. There will be a range of factors that will influence the economics of biomethane production compared to electricity generation activities, including the relative prices of gas and electricity as well as revenue from ACCUs and renewable electricity certificates.

Appendix 1 lists the waste feedstocks eligible for biomethane creation under the above methods.

Agricultural waste feedstocks

Each waste method in the proposed biomethane method package specifies the types of wastes eligible to be treated under those methods. Many types of agricultural waste, such as harvested crop waste or sugarcane trash, are generally not eligible under these methods³.



In 2021, the Clean Energy Regulator engaged the Queensland University of Technology to review the viability of including of agricultural wastes as a biomethane production feedstock under an ERF method. The report identified that while many agricultural wastes could be diverted to produce biomethane, emissions impacts associated with diversion of these wastes – for example, decreased soil carbon from removal of crop waste from land – were likely to be significant for many waste types.

QUT concluded that further research on these effects, known as ‘leakage’ effects, would be required to accurately model their impact on net abatement in an ERF method. As such, agricultural wastes were not included in the scope of the 2021 proposed biomethane method package.

In October 2021, the Minister for Industry, Energy and Emissions Reductions announced further research into using agricultural wastes as potential feedstocks to support an enhanced biomethane method⁴.

Carbon abatement from biomethane projects

When an ERF biomethane project captures biogas from waste and turns it into biomethane that is used as a natural gas substitute, two different types of carbon abatement are generated. They are known as **conversion abatement** and **displacement abatement**.

- **Conversion abatement** – in the business-as-usual scenario, methane in biogas emitted from decomposing waste escapes into the atmosphere. This is a significant source of emissions because methane’s global warming potential is 28 times that of carbon dioxide. Capturing and combusting biogas converts the methane to carbon dioxide and reduces emissions generating carbon abatement. This type of abatement is termed ‘conversion abatement’. An example of a conversion activity is combusting biomethane in a boiler to generate heat.
- **Displacement abatement** – combustion of biomethane as a natural gas substitute, for example, when biomethane is injected into the gas network or burned for heat or power, displaces an equal volume of natural gas consumption. Emissions from biomethane combustion are negligible because it is of biogenic origin and considered to have net-zero emissions. By comparison, combustion of natural gas emits 51.5 kilograms of CO₂-e per gigajoule⁵. Displacing natural gas with biomethane therefore results in carbon abatement, termed ‘displacement abatement’.

³Some agricultural wastes can be eligible under the animal effluent method in specific circumstances. In particular, wastes will need to have been treated in an open anaerobic pond in the absence of an ERF project.

⁴ Minister for Industry, Energy and Emissions Reduction, New ERF method and 2022 priorities announced, Media Release, 1 October 2021, <https://www.minister.industry.gov.au/ministers/taylor/media-releases/new-erf-method-and-2022-priorities-announced>

⁵ See Schedule 1 of the National Greenhouse and Energy Reporting (Measurement) Determination 2008, available from <https://www.legislation.gov.au/Series/F2008L02309/Compilations>

Biomethane project activities

An ERF biomethane project can create both conversion and displacement abatement by producing biomethane. Each method in the proposed biomethane method package will be varied to incorporate 2 types of project activity, one for each type of abatement.

Table 1: Biomethane project activities

Project activity	Activity description	Abatement credited
Biogas generation for biomethane	This activity involves capturing emissions from eligible waste, either in an anaerobic digester or from landfill, and capturing the biogas that would otherwise be released into the atmosphere and transporting that gas to a <i>biomethane production dispatch system</i> – a system that transports the biogas to a facility or equipment to be upgraded into biomethane under the biomethane production activity.	Conversion abatement
Biomethane production	This activity also involves receiving biogas generated from eligible waste sources and upgrading the biogas to produce biomethane using a <i>biogas upgrading system</i> . The biomethane must then be sent to an end use where it is expected to displace natural gas that would be combusted within Australia, creating displacement abatement.	Displacement abatement

A project that involves biogas generation for biomethane must also include biomethane production to ensure the biogas is turned into biomethane. Biogas upgraded into biomethane must be sent to an end use where it is combusted, resulting in conversion abatement.

Using this guide

This document is a guide on how to register, run and report on a biomethane project. It is based on the framework of the 3 ERF waste methods that form the proposed biomethane method package and are the legislative instruments that set out the rules and processes that must be followed to earn carbon credits for biomethane activities.

People seeking to conduct a biomethane project should read the relevant legislation and guidance for that selected method that the project will use and seek professional advice as necessary.

Planning and registering your ERF project

There are general requirements that need to be met to participate in the ERF, as well as specific requirements contained in the individual methods in the proposed biomethane method package. Project proponents will also need to consider project costs and potential carbon credit returns as well as the legislative requirements.

Eligibility requirements

You must first register your biomethane project as an eligible offsets project before it can begin earning ACCUs.

Eligible offsets projects must meet the requirements in Section 23 of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (CFI Act) and Section 13 of the Carbon Credits (Carbon Farming Initiative) Rule 2015 (CFI Rule). Each method that will include biomethane as an eligible activity also has method-specific eligibility requirements. **Appendix 1** summarises each method's eligibility requirements.

General eligibility information that must be provided to the Regulator when applying to register your project include:

- a summary of the project, including details of its location
- details of the applicant
- details of the project's activities that show how they are eligible under the method
- the skills and expertise available to the applicant to carry out the project
- a description of the approvals required to undertake the project and progress in obtaining these approvals
- information that shows that the applicant has the legal right to carry out the project
- an estimate of the forward abatement (emissions reduced) available from the project
- details of how the project meets the additionality requirements.
- For more information on eligibility, visit [our website](#)⁶.

Fit and proper person assessment

You need to be recognised as a [fit and proper person](#)⁷ for the purposes of the ERF. The fit and proper test involves declarations about any convictions or insolvency and whether a person has the capabilities needed to run a project.

Regulatory approvals

You need to ensure you have all relevant approvals, licenses, permits or authorities that are required to carry out your project.

For a biomethane project, relevant regulatory approvals may include:

- Development and building approval for biomethane upgrading and gas injection infrastructure.
- Gas quality standards injection approvals and gas safety and management requirements.
- Environmental laws or permits.

⁶ <http://www.cleanenergyregulator.gov.au/ERF/Want-to-participate-in-the-Emissions-Reduction-Fund/Planning-a-project>

⁷ <http://www.cleanenergyregulator.gov.au/About/Policies-and-publications/fit-and-proper-person-posture>

Hold legal right

You need the legal right to undertake your project and claim ACCUs. For a biomethane project, the owner of the facility at which biogas generation for biomethane and biomethane production activities are occurring would typically hold legal right. Projects undertaking biomethane production may also need to demonstrate that they hold the legal right to dispatch the biomethane – for example, if the project injects biomethane into the gas network, the project proponent may need to demonstrate that the gas network owner has consented to this arrangement.

You may need a written agreement to evidence legal right if there are multiple parties involved in the project.

Additionality – Newness

For a project to be declared an eligible offset project, Section 27(4A)(a) of the CFI Act requires the project ‘has not begun to be implemented’. This is known as the ‘newness’ test.

Activities that may not meet newness include:

- making a final investment decision on the project
- purchasing equipment
- commencing construction.

An existing waste facility that currently captures and destroys methane but does not generate biomethane may be eligible to conduct a biomethane project where the new activity involves installing biogas upgrading and biomethane production equipment. A facility that formerly had an ERF waste project and did not produce biomethane may be able to re-enter the scheme as a restarting biomethane project and earn carbon credits for biomethane production, subject to eligibility requirements. Restarting biomethane projects may only be able to claim credits for displacement abatement.

For more information, see Error! Reference source not found..

Additionality – Regulatory additionality

For a project to be declared an eligible offset project, Section 27(4A)(b) of the CFI Act requires the project is ‘not required to be carried out by or under a law of the Commonwealth, a State or a Territory’ (regulatory additionality).

In October 2020, the Clean Energy Regulator published guidance on the approach for addressing regulatory additionality where greenhouse gas offset obligations are imposed by State or Territory Governments⁸. In brief, where an entity establishes an ERF project and is also subject to a regulatory obligation to reduce or offset their emissions, any ACCUs generated by that project used to meet the regulatory requirements must be put aside permanently in a Commonwealth holding account. These units cannot be sold or transferred to another party including the Commonwealth. However, any ACCUs resulting from the project that are not used to meet regulatory obligations can be made available to the market.

⁸ <http://www.cleanenergyregulator.gov.au/ERF/Want-to-participate-in-the-Emissions-Reduction-Fund/Planning-a-project/regulatory-additionality-and-government-programs/regulatory-additionality-for-regulated-entities-with-state-or-territory-emission-reduction-or-offsetting-requirements>

This means that if there is a regulatory requirement on a biomethane project to meet an offset or emissions reduction obligation, then the project will only be able to sell ACCUs to the extent that the project results in more abatement than the offsetting obligation requires.

Additionality – Government program additionality

Section 21 of the CFI Rule creates in lieu of government program requirements that substitute for the general requirements in paragraph 27(4A)(c)(i) of the CFI Act (the government program requirement). Section 21 of the CFI Rule excludes ERF projects from also receiving funding or certificates under some State and Commonwealth programs, including the Renewable Energy Target (in some circumstances), and some state-based energy efficiency certificate schemes.

This means that ERF projects are able to receive funding from other government programs not listed in Section 21 of the CFI Rule, subject to the other eligibility requirements.

Crediting periods and start dates

The crediting period and start date establish the commencement and end date for the crediting of ERF projects, that is, the period of time over which the project can receive ACCUs.

Biomethane project crediting periods

There are 2 broad types of ERF biomethane projects:

- **Conversion and displacement projects** – these projects involve both biogas generation for biomethane and biomethane production activities.
- **Displacement-only projects** – these projects only involve biomethane production activities.

Within the framework of the existing waste methods and the two types of projects described above, the proposed biomethane method package will allow for 4 kinds of projects:

- **New biomethane projects:** These projects may be conversion and displacement projects or displacement-only projects. They involve building new facilities to produce biomethane or commencing biomethane production at existing facilities that have never generated biomethane and have never conducted an ERF waste project.
- **Expanding biomethane projects:** These are existing ERF waste projects that have never generated biomethane but wish to add biomethane conversion and displacement activities as an eligible abatement activity.
- **Restarting biomethane projects:** These projects add biomethane production to facilities that previously had an ERF waste project but whose crediting period has ended and that had never previously produced biomethane. Such facilities would be able to register a new conversion and displacement project to earn ACCUs for producing biomethane, less the time the previous ERF project earned ACCUs for conversion abatement.
- **Restarting displacement-only projects:** These projects can take place if a project received credits for displacement abatement for less than 12 years. They continue undertaking biomethane production activities until the 12-year crediting period for displacement abatement has been completed.

New conversion and displacement projects and displacement-only projects will be eligible for a crediting period of up to 12 years.

Crediting periods for non-biomethane projects on a related site can continue in parallel to biomethane conversion and displacement projects. The original crediting period for non-biomethane activities is not changed by addition of biomethane project activities. A project cannot claim abatement for a non-biomethane activity for a period longer than its original crediting period.

Displacement-only projects relate solely to the treatment of biogas to produce biomethane and not the treatment of waste to avoid methane emissions. A displacement-only project cannot have project activities other than biomethane production. Therefore, its crediting period is always 12 years from the start date.

Proposed crediting periods for biomethane projects are set out in **Error! Reference source not found..**

Table 2: Biomethane project crediting periods

Project type	Crediting period	
New biomethane projects	Conversion and displacement projects	12-year crediting period from the start of the project.
	Displacement-only projects	12-year crediting period from the start of the project.
Expanding biomethane projects	Conversion and displacement biomethane projects	<p>12-year crediting period commencing from the start date of the original project.</p> <p><i>Example: a wastewater treatment facility with an ERF project starts biomethane activities 6 years into the crediting period of the pre-existing wastewater project. Conversion and displacement abatement for biomethane can be earned for the remaining $12 - 6 = 6$ years in the project's crediting period.</i></p> <p>If an expanding biomethane project has had less than 12 years of crediting for displacement activities at the end of its crediting period, it can undertake a restarting displacement-only project to earn ACCUs until 12 years of displacement abatement have been credited.</p>
	Displacement-only projects	<p>Not applicable – Displacement-only projects do not involve project activities other than biomethane production. An existing expanding biomethane project must be a conversion and displacement project.</p> <p>If a proponent wishes to add a displacement-only project to an existing facility, it should be registered as a new displacement-only project, rather than an expansion.</p>
Restarting biomethane project	Conversion and displacement project	<p>$(12 - x)$ year crediting period, where x is the length of the crediting period of the former ERF project.</p> <p><i>Example: a wastewater treatment facility previously had an ERF project with a 7-year crediting period. The facility starts biomethane activities and re-enters the ERF as a restarting</i></p>

Project type	Crediting period	
		<i>biomethane project. The crediting period for biomethane conversion and displacement abatement is 5 years.</i>
	Displacement-only projects	Not applicable – see restarting displacement-only projects.
Restarting displacement-only project	Conversion and displacement project	Not applicable.
	Displacement-only projects	(12 – x) year crediting period, where x is the length of the period in which the project earned ACCUs for biomethane displacement period under a previous project (e.g. an expanding conversion and displacement project).

Biomethane crediting period example

An ERF wastewater treatment project begins in 2024 and flares waste biogas for two years. In 2026, it also begins biomethane conversion and displacement project activities. Under the wastewater method, flaring has a crediting period of seven years while biomethane can have up to 12 years of crediting.



As an expanding biomethane project, the wastewater project's crediting period for conversion and displacement activities is 12 years, ending in 2036 (12 years from 2024). During this period, the project can also earn credits for flaring waste biogas. However, the project cannot claim credits for flaring biogas for a cumulative period of more than 7 years (84 months), as this is the original crediting period afforded to that activity under the wastewater method. It is not extended by starting biomethane production.

In 2036, the project has earned 12 years of conversion abatement credits (including both flaring and biomethane conversion abatement), and 10 years of displacement abatement credits. To access the remaining two years of displacement abatement, the proponent registers the facility as a restarting displacement-only project with a crediting period of two years. The crediting period of this project ends in 2038, after which no further abatement can be credited.

When considering whether to recommend to the Minister that a method be made, the Emissions Reduction Assurance Committee (ERAC) must take into account whether the biomethane project activities would result in carbon abatement that would be unlikely to occur in the ordinary course of events over the whole crediting period. This concept is known as additionality.

- Displacement and conversion abatement from biomethane projects is a new form of abatement being credited by the ERF for an activity that is currently not occurring in Australia (except in small pilots) due to a range of economic and other barriers. Therefore, a 12-year crediting period is considered as additional and not in the ordinary course of business.

- Activities resulting in conversion abatement are considered additional for 12 years, consistent with the landfill gas and animal effluent methods.
 - » Unlike displacement abatement, conversion abatement can be generated from non-biomethane activities (e.g. flaring of waste methane).
 - » To ensure additionality, the crediting period for expanding biomethane projects that are already destroying waste methane and creating conversion abatement is therefore limited to 12 years from when the project originally commenced so that ACCUs can only be issued for conversion abatement for a total of 12 years.
- Crediting periods for existing non-biomethane activities under the 3 ERF waste methods in the proposed biomethane method package are unchanged.

Start date

The start date is the date when the crediting period commences, that is, the day from which a project can begin to earn ACCUs. Scheme participants can nominate any start date from the date the project is declared by the Clean Energy Regulator, and up to 18 months afterwards.

Running and reporting on your project

Following the declaration that your project is an eligible offset project you may then start your project. You will then need to report on the net emissions from your project to the Clean Energy Regulator.

Conducting your project

The following steps provide a high-level overview of the process to run a new biomethane project:

- **Plan your project** ensuring your proposed project meets eligibility requirements under the relevant method. You will need to ensure your project is treating eligible waste under the relevant method, as not all waste feedstocks are allowed under all methods.
- **Register your project** with the Clean Energy Regulator – see **Starting a biomethane project** below.
- **Install equipment** and infrastructure for your project. Depending on your project activities, this could include installing:
 - » biogas capture and waste treatment equipment (e.g. gas collection pipelines and anaerobic digesters)
 - » biogas upgrading equipment to refine the biogas into pipeline-ready biomethane
 - » gas pipeline injection and metering infrastructure or mobile transport to send biomethane to customers.
- **Run the project** ensuring the equipment is operating correctly and that project biomethane meets the applicable territory, state, and industry gas standards.
 - » Commence operation of biomethane activities and report your abatement to the Clean Energy Regulator at least once every 2 years.

Note that you can defer the start date of your crediting period by 18 months. Delaying it until after infrastructure construction is complete can help maximise your project's ability to generate ACCUs during the crediting period.

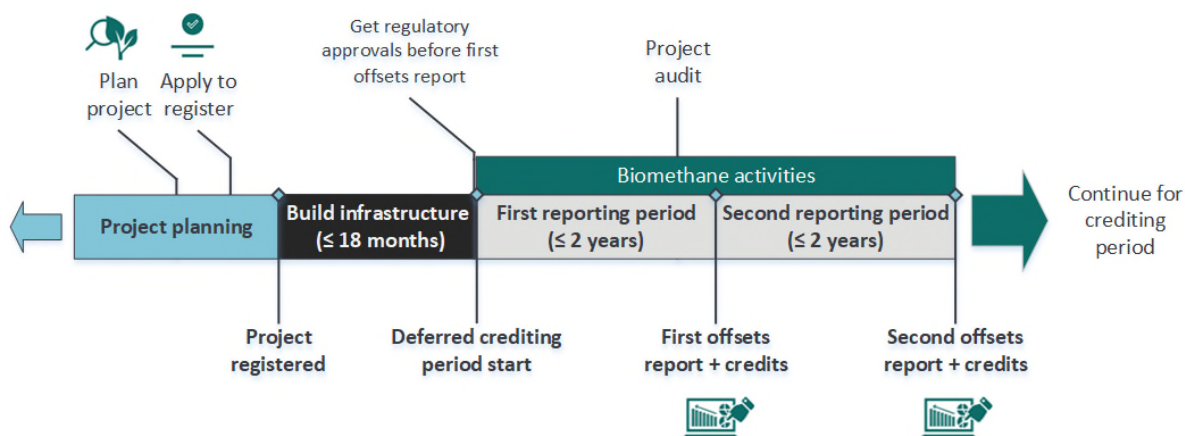


Figure 2: Indicative timelines for a biomethane project

Note: Scheme rules allow flexibility as to the timing of reporting periods and the above 2 year timeframe is illustrative only.

Starting a biomethane project

The process for starting a biomethane project at a waste facility will depend on whether the project is a new, restarting or restarting displacement-only biomethane project, or an expanding biomethane project that adds on to an existing ERF project.

New or restarting biomethane projects

If the proposed project is a new, restarting, or restarting displacement-only biomethane project, you must follow the standard registration process for a new ERF project:

1. Register your project with the Clean Energy Regulator under the applicable waste method. You can apply to register a project using the [Clean Energy Regulator Client Portal](#)⁹. Do not commence project activities before your project is registered or you may fail to meet the newness test.
2. Implement biomethane project activities in accordance with your project's method. This may include getting appropriate regulatory approvals, installing equipment, and commencing biomethane project activities such as injection into the gas network.
3. Report on your project's abatement to the Clean Energy Regulator at least once every 2 years and earn ACCUs for project carbon abatement.

Expanding biomethane project

To start biomethane activities at an existing ERF project (an expanding biomethane project), you will need to ensure that your project is registered under a version of the method that permits biomethane activities.

If your project is under a method version that does not include biomethane activities, you will need to vary your project's method. This can be done through the [Clean Energy Regulator Client Portal](#)^{Error! Bookmark not defined.}. You will need to ensure all eligibility requirements are met, which may include identifying existing ERF projects at the project facility and providing information on proposed biomethane activities.

⁹ Clean Energy Regulator, 2021, Client Portal, <http://www.cleanenergyregulator.gov.au/OSR/CP>

Once your project is successfully registered under a method that includes biomethane activities, you can commence project biomethane activities, report on abatement and earn ACCUs. You will generally need to provide details about your new biomethane activities the next time you report to the Clean Energy Regulator. Note that the crediting period start date will remain the start date of the original project and is not reset when you vary the method.

Implementing biomethane activities

The proposed biomethane method package aims to be technology neutral. This is to allow projects to undertake any form of biomethane upgrade and distribution system that is technologically and economically suitable provided relevant regulations and gas standards for injected biomethane are met and eligible wastes under the selected method are used.

The 2 types of biomethane activity, biogas generation for biomethane and biomethane production, encompass different stages of the biomethane production process. The implementation steps for each are listed in **Table 3** and are discussed further below.

Table 3: Biomethane project activity implementations

Project activity	Implementation
Biogas generation for biomethane activity	<ul style="list-style-type: none"> • Biogas generation • Biogas transport to a biomethane production dispatch system
Biomethane production activity	<ul style="list-style-type: none"> • Biogas upgrading and compression • Biomethane transport to end-users

Figure 3 illustrates the flow of waste, biogas and biomethane between the 4 implementation steps for biomethane activities, separated between biogas generation for biomethane activities and biomethane production activities. Emissions attributed to either biogas generation for biomethane activities or biomethane production activities are also illustrated, as these will need to be accounted for when determining net abatement from each activity – see **Net abatement** below.

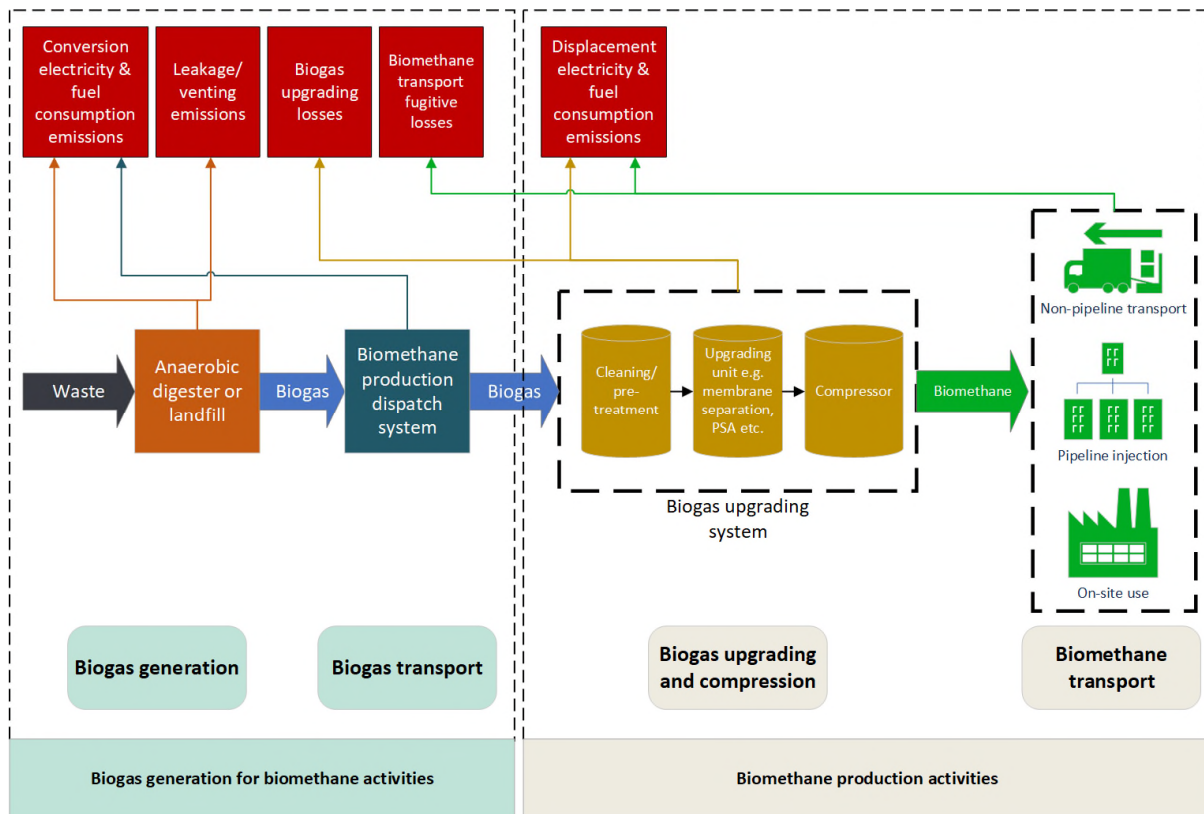


Figure 3: Biomethane activities and emissions

Biogas generation

The biogas generation for biomethane activity starts with the production and capture of biogas from waste. The 3 waste methods in the biomethane package cover different sources of waste biogas:

- **Landfill gas (electricity generation) projects** collect landfill gas (a biogas) by sinking wells into the landfill combined with a blower system to extract the gas.
- **Wastewater projects** treat domestic, commercial, or industrial wastewater in covered lagoons or anaerobic digesters to generate biogas.
- **Animal effluent projects** involve processing animal waste in covered lagoons or anaerobic digesters, which produce and collect biogas.

Each method has requirements for eligible waste and eligible waste processing technologies or systems that projects must follow.

Once the biogas has been produced and captured as part of a biogas generation for biomethane activity, it must be sent to a biomethane production dispatch system.

Biogas transport to a biomethane production dispatch system

After biogas has been generated as part of a biogas generation for biomethane activity, it must be sent to a biomethane production dispatch system.

A biomethane production dispatch system is a system of gas transport equipment that transports biogas to a system that can upgrade the biogas into biomethane. A biomethane production dispatch system can be stationary, for example, a pipeline to transport biogas to an upgrading system, or it can be mobile, such as a system of trucks or other mobile infrastructure.

The biogas upgrading system that receives and upgrades biogas supplied by the biomethane production dispatch system can be at the same site as the biogas-generating waste facility, or at an entirely different facility. For example, a specialised biomethane production facility that receives biogas from a range of waste sources may be part of the project but be located at a different site to the waste treatment facility – a biomethane production dispatch system can send biogas to that facility.

The biomethane produced from biogas carried by a biomethane production dispatch system must be reasonably expected to be combusted within Australia as a natural gas substitute, to ensure that conversion abatement from destroying the waste methane occurs. It is assumed that the methane in biogas sent to a biomethane production dispatch system is destroyed, and conversion abatement is credited on this basis. Biomethane production dispatch systems are therefore treated similarly to flares or other combustion devices that credit the destruction of methane sent to them.

Biogas upgrading and compression

A biomethane production activity begins by receiving eligible biogas and upgrading that gas into pipeline quality biomethane, which typically has a methane proportion of at least 95%.

Eligible biogas

Biogas upgraded into biomethane as part of a biomethane production activity must be *eligible biogas*. Biogas is eligible biogas if it is generated from waste that would be eligible to be treated under one of the 3 methods in the proposed biomethane method package.



The waste facility supplying biogas does not need to have an ERF project for the biogas to be eligible biogas – you will just need to demonstrate that the waste used to produce biogas would fit under one of the methods in the proposed biomethane method package.

A biomethane production activity can upgrade biogas from multiple sources and can upgrade ineligible biogas. However, no ACCUs can be issued for displacement abatement associated with upgrading ineligible biogas. If your project includes a mix of eligible and ineligible biogas, you will need to estimate the proportion of eligible to ineligible biogas and apportion net abatement accordingly.

There are a range of commercial biogas upgrading systems available. System designs vary in their impurity scrubbing mechanism, energy consumption, gas pre-scrubbing requirements, capital cost and size.

Examples of existing commercial upgrading technologies include:

- **Membrane separation** – physically separates molecules by size and charge through a membrane.
- **Pressure swing adsorption** – gas impurities are adsorbed on to a surface under high pressure, with contaminants ejected into a tail gas when chamber pressure is lowered.
- **Amine scrubbing** – biogas is passed through a chemical solvent that dissolves and removes the carbon dioxide.

- **Water wash** – biogas is passed through water under high pressure to dissolve impurities.

Depending on the upgrading technology used, there may be several sub-processes during the upgrading stage. This could include pre-treatment steps to scrub the biogas of hydrogen sulphide and other impurities, or drying stages to remove moisture. The final biomethane will generally need to be compressed for transport to the end user.

While biogas upgrading is not currently common practice in Australia's waste sector, these technologies are in use at scale in the North American and European waste industries. Proponents of biomethane projects will need to make a commercial investment assessment regarding the system or systems would be most appropriate for their project circumstance.

Biogas upgrading system requirements

The proposed biomethane method package does not specify what type of technology can or must be used. However, a project's biogas upgrading system must meet the following requirements:



- The biomethane produced meets the natural gas quality standards required under the relevant regulatory regime.
- Biomethane quality and composition is monitored.
- Waste gases lost during the biogas upgrading process are monitored. These losses are used in abatement calculations for the biogas generation (for production) activity.
- Fuel and electricity consumed by the upgrade process must also be monitored for use in the abatement calculations.

Biomethane transport to end users

After the biogas has been upgraded into biomethane, the biomethane must be transported to the end user. End uses of biomethane may vary depending on commercial agreements with gas buyers. The proposed biomethane method package does not specify how biomethane must be used as long as it can be expected to be combusted within Australia as a natural gas substitute. Emissions associated with transporting biomethane must also be monitored as part of the biomethane production activity.

Transporting biomethane to end users may involve one or more of the following:

- Injection of biomethane into a gas network¹⁰. A compressor system is needed to deliver the gas at the correct pressure, and piping and injection infrastructure will be needed to connect the biomethane to the gas mains. The volume of biomethane injected will need to be metered.
- Transport of biomethane using non-pipeline infrastructure such as trucks or other vehicles.
- Using biomethane on-site for heat or to produce electricity.

When reporting on a biomethane production activity, information on the end uses of produced biomethane must be provided.

¹⁰ Subject to the relevant state or territory regulations and any regulatory approvals.



Biomethane end use information

Project proponents will need to provide information on how their project's biomethane is to be used to ensure that the methane is destroyed and conversion abatement occurs. Contracts, agreements, or declarations from relevant personnel about the end uses of project biomethane are forms of supporting evidence.

Net abatement

Projects are credited for the net abatement they generate, which will be given by the total abatement created minus emissions associated with the project.

Biomethane abatement will be achieved both through conversion of methane emissions into carbon dioxide via combustion, and by displacing natural gas from fossil fuel sources.

Conversion abatement

Conversion abatement is generated from the combustion of waste methane. In non-biomethane projects, this combustion occurs on-site using a flare or generator.

In a biomethane project, the biomethane can be combusted on-site, injected into the gas network, or transported through non-pipeline means, such as by truck, to an end use where it is combusted.

The general form of the equation is set out below.

$A_{Conversion,BM} = Q_{CH4,BM} \times (1 - PL) \times (1 - TL) \times DE - PE_{Conversion}$	
$A_{Conversion,BM}$	Net conversion abatement from biomethane, in tonnes CO ₂ -e.
$Q_{CH4,BM}$	<p>Quantity of methane sent for combustion either on-site or off-site, in cubic meters.</p> <p>$Q_{CH4,BM}$ is the quantity of methane that would have been vented into the atmosphere in the absence of the biomethane project.</p> <p>Emissions are avoided by instead capturing, upgrading, and combusting this quantity of methane to form carbon dioxide. The proposed biomethane method approach defines this emissions avoidance activity as conversion abatement.</p> <p>The loss terms in this equation (PL, TL, and DE) account for the fact that not all the waste methane turned into biomethane will be burned. Some methane will be lost during the production and transport process. This lost methane does not contribute towards the project's net abatement as it still escapes to atmosphere, which is reflected in the abatement calculations.</p>
PL	Production loss factor is a fraction that represents the proportion of methane lost during the biogas upgrading process. Losses will depend on site operating conditions and the biogas upgrading technology employed.

	A proponent can either use a methane loss factor provided by the equipment manufacturer or assume a default loss factor of 4% (factor of 0.04) ¹¹ .
TL	<p>Transport loss factor is a fraction that represents the proportion of methane lost during transport of biomethane. Losses could include leakages during gas transfers or through transmission in a pipeline.</p> <p>The transport loss factor is 0 if all biomethane produced is consumed at the biomethane facility. In this scenario, limited gas transfer occurs and assuming losses are negligible is reasonable.</p> <p>If not all biomethane produced is consumed at the biomethane facility, the factor is 0.02, representing a 2% loss factor. This factor is calculated based on average unaccounted for gas values for distribution networks in the National Inventory, weighted by state and territory gas consumption rates¹².</p>
DE	<p>Destruction efficiency of the methane sent into the gas network or used on-site.</p> <p>A destruction efficiency of 98% (factor of 0.98) is assumed, consistent with the approach taken in the National Inventory.</p>
PE_{Conversion}	<p>Project emissions from biogas generation for biomethane project activities. These emissions are associated with conversion abatement and need to be deducted to ensure the amount of ACCUs issued accurately reflects the net abatement associated with a project's biomethane activities.</p> <p>Specific project emissions sources accounted for here will depend on the relevant method, but broadly will include:</p> <ul style="list-style-type: none"> • Emissions from electricity and fuel consumption by anaerobic digesters and biomethane production dispatch systems. • Loss or venting emissions from anaerobic digester operation.

Displacement abatement

Displacement abatement is calculated through equations added as part of the proposed biomethane method package amendments. Factors influencing displacement abatement include:

- the volume of biomethane injected into the gas network, which determines the quantity of natural gas displaced,

¹¹ The default production loss factor is a conservative estimate based on a paper by Ardolino et al (available from [https://www.researchgate.net/publication/347003218_\(PDF\)_Biogas-to-biomethane_upgrading:_A_comparative_review_and_assessment_in_a_life_cycle_perspective_\(researchgate.net\)](https://www.researchgate.net/publication/347003218_(PDF)_Biogas-to-biomethane_upgrading:_A_comparative_review_and_assessment_in_a_life_cycle_perspective_(researchgate.net))). Table 3 of the review identifies 'worst case' methane slip rates of 2% for the 4 most popular biogas upgrading technologies. Hence a value of 4% was selected as a conservative default

¹² The default transport loss factor was estimated using the unaccounted for gas fractions and Method 1 in section 3.81 of the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (available from <https://www.legislation.gov.au/Series/F2008L02309>) weighted by the gas consumption percentage for each state per the Australian Energy Update 2020 Table C (available from <https://www.energy.gov.au/publications/australian-energy-update-2020>). This default loss factor was estimated using the unaccounted for gas fractions and Method 1 in section 3.81 of the National Greenhouse and Energy Reporting (Measurement) Determination 2008

- the proportion of the biogas used to produce biomethane that is eligible biogas, and
- emissions from energy and fuel consumption consumed during biogas upgrading.

The general calculation approach for displacement abatement is set out below.

$A_{Displacement,BM} = E_{NatGas} \times EA - PE_{Displacement}$	
$A_{Displacement,BM}$	Net displacement abatement, in tonnes CO ₂ -e.
E_{NatGas}	<p>The combustion emissions, in tonnes CO₂-e, from a volume of natural gas equivalent to the volume of biomethane produced by the project.</p> <p>This value represents the emissions avoided through the displacement of natural gas by biomethane. It is determined by multiplying the volume of natural gas displaced (that is, the volume of biomethane produced and sent for combustion) by the National Greenhouse and Energy Reporting (NGER) emissions factor for natural gas in a pipeline⁵.</p> <p>If a project uses some biomethane on-site for heat or power, the quantity of biomethane used to displace the quantity of commercial natural gas consumed from the grid can also be credited.</p>
EA	<p>The eligible abatement fraction, representing the proportion of biogas upgraded into biomethane that is <i>eligible biogas</i>.</p> <p>The proposed biomethane method package allows for an ERF project biogas upgrading system to accept biogas from sources besides biogas directly produced by the project. This measure is to help biomethane production facilities gain greater economies of scale by allowing the processing of biogas from a broader range of sources.</p> <p>Suppliers of biogas to a project biomethane facility do not have to have ERF projects. However, for biogas to be eligible biogas it must have been produced from treatment of waste that is deemed eligible waste under one of the 3 waste methods in the proposed biomethane method package¹³.</p> <p>For each biogas source, the project proponent must estimate the fraction of biogas supplied for biogas upgrading that is eligible biogas.</p> <p>Evidence must be provided to the Clean Energy Regulator about how this fraction is determined. If all biogas is sourced from an ERF project that only treats eligible waste, the eligible abatement fraction will be 1.</p>

¹³ Biomethane displacement ACCUs are only issued when the biomethane is produced from biogas that came from an eligible waste source under one of the 3 waste methods because the business-as-usual treatments for these wastes is understood. Diverting non-ERF method waste sources to produce biomethane may cause leakage emissions (e.g. diverting crop wastes previously left in fields may decrease soil carbon) that are not captured in the net abatement calculations. Not crediting biomethane produced from these waste streams controls for this leakage risk.

$PE_{Displacement}$	<p>Emissions associated with electricity and fuel use by the project for biomethane activities, such as for upgrading or compression equipment, in tonnes CO₂-e.</p> <p>Energy use emissions are calculated by measurement and metering of fuel and electricity use, multiplied by the relevant NGER emissions factors.</p>
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Displacement calculation example

A wastewater facility produces and injects 100 terajoules (TJ) of biomethane in a year into the natural gas network.

- The NGER (Measurement) Determination emissions factor for natural gas is 51.53 kg CO₂-e/GJ
- Therefore gross displaced gas emissions = (100,000)*(51.53)/1000 = 5,153 tCO₂-e
- All biogas upgraded into biomethane is produced at the wastewater facility, so the eligible abatement fraction is 1.
- Emissions from energy used in the upgrading process comes to 100 tCO₂-e

$$\begin{aligned}\text{Net displacement abatement} &= 5,153 * 1 - 100 \\ &= 5,053 \text{ tCO}_2\text{-e}\end{aligned}$$

Biomethane use in ERF fuel switching projects



Using biomethane produced at an ERF biomethane production project at another ERF project involving a fuel switching activity – for example, under the Carbon Credits (Carbon Farming Initiative—Industrial Electricity and Fuel Efficiency) Methodology Determination 2015 – introduces a risk that displacement abatement is being double counted. Displacement ACCUs under a biomethane project credit the avoided use of natural gas. A fuel switching ERF project could use low emissions biomethane to also avoid the use of natural gas, earning more ACCUs for the same activity.

To ensure double counting cannot occur, biomethane produced at an ERF biomethane project cannot be used in another ERF project undertaking fuel switching. If this occurs, displacement abatement for the ERF biomethane project is set to zero.

Reporting and crediting

Carbon credits (ACCUs) from a biomethane project will be issued following lodging of a report and an assessment by the Clean Energy Regulator.

Offsets reports and claiming carbon credits

Once the crediting period for your project has commenced you must provide offset reports in accordance with Section 76 of the CFI Act and Section 70 of the CFI Rule. The first offsets report covers the period commencing from the start of the crediting period and you can choose a duration of between six months and two years¹⁴. Subsequent reporting periods commence immediately after the end of the previous reporting period and you can choose between one month and two years.

An offsets report is the document (plus supporting information) that you provide to us that details your project's progress, including the net abatement amount. An offsets report may include an 'application for certificate of entitlement' under Section 12 of the CFI Act and Section 7 of the CFI Rule.



Claiming carbon credits

You can claim carbon credits each time you submit your offsets report if a net abatement amount has been determined during the reporting period

You should provide an offsets report no later than 6 months after the end date of each reporting period.

You can submit your offsets report through the [Clean Energy Regulator Client Portal](#)^{Error! Bookmark not defined.}. To be issued carbon credits you'll need to [set up an Australian National Registry of Emissions Units \(ANREU\) account](#)¹⁵.

We will assess your offsets report within 90 days unless further information is required. If we assess everything to be in order, we will issue your carbon credits into your ANREU account.

Auditing requirements

Your project needs to be audited to align with our legislative requirements. The number of audits required over the crediting period will depend on the project size and the forward abatement estimate. Most biomethane projects will require three audits, including one with the first report.

Each audit report is submitted at the same time you apply for carbon credits. We will provide you with an audit schedule when your project is registered. It will tell you which reports need to include audits. For example: "Audit 2: First project report submitted after 25/07/2024".

Engaging auditors

We recommend you engage an auditor early when developing your project, as this will help you work out audit costs. You can find a list of [registered auditors](#)¹⁶ on our website.

¹⁴ Projects can report as frequently as monthly if more than 2,000 ACCUs are being sought in the reporting period.

¹⁵ <http://www.cleanenergyregulator.gov.au/OSR/ANREU/Opening-an-ANREU-account>

¹⁶ <http://www.cleanenergyregulator.gov.au/Infohub/Audits/register-of-auditors>

Other matters

Notification requirements

You will need to notify us if your project changes, for example, if the person running the project changes. **Appendix 2: Notification requirements** lists events that you need to notify the Clean Energy Regulator about and how long you have to provide that notification.

Making changes to your project

- You can make changes to your project to adjust for changing circumstances, such as varying the proponent for your project.

To make changes (variations) to your project, you will need to complete a Project Variation form, located in the [Clean Energy Regulator Client Portal](#). See **Appendix 3: Project variations** for a summary of allowed changes and information requirements.

National Greenhouse and Energy Reporting and safeguard mechanism interactions

National Greenhouse and Energy Reporting

The National Greenhouse and Energy Reporting (NGER) scheme is Australia's national framework for reporting and publishing company information about greenhouse gas emissions, energy consumption and energy production.

The NGER scheme requires companies and facilities with emissions over set thresholds to report their energy consumption emissions. However, at the time of publication there is no emissions factor for the combustion of biomethane used by a facility. This means that facilities that wish to buy biomethane may not be able to report emissions reduction from its use, compared to regular natural gas.

The Department of Industry, Science, Energy and Resources is considering how pipeline biomethane might be accounted for under the NGER scheme.

Safeguard mechanism

The safeguard mechanism creates incentives for very large emitting facilities, known as 'safeguard facilities', to keep their emissions below a baseline emissions level. Safeguard facilities must periodically report on their emissions based on their net emissions number and surrender ACCUs if their emissions exceed the facility's baseline.

The Clean Energy Regulator will develop further advice on how the safeguard mechanism will operate for biomethane projects.

Disclaimer

This document is provided to stakeholders as part of the consultation process to develop a proposed biomethane method package. The proposals contained in this document are intended only as a basis for public consultation.

Appendix 1 – Eligibility requirements

Table 4 summarises the eligible wastes under the 3 methods in the proposed biomethane method package. Wastes from these sources are eligible to be credited displacement abatement ACCUs when used for biomethane production.

Table 4: Eligible waste for each biomethane package method

Method	Eligible waste	Excluded wastes	Treatment
Landfill gas (electricity generation)	Wastes eligible to be disposed of in a landfill		Collection and capture
Wastewater treatment	Domestic or commercial wastewater Industrial wastewater		<ul style="list-style-type: none"> Anaerobic digesters
Animal effluent	<p>Either organic effluent that:</p> <ul style="list-style-type: none"> Was produced by a piggery, dairy, or a facility that generates a liquid waste stream as part of its normal operation, A liquid waste stream that consists only of water, animal faeces and urine, and incidental waste eg. spoiled feed that would normally be treated in an anaerobic pond, or <p>Organic effluent that:</p> <ul style="list-style-type: none"> Consists principally of materials that are a listed type in Schedule 1 of the animal effluent supplement¹⁷, and Would have, in the absence of the ERF project, been treated in an open anaerobic pond. 		<ul style="list-style-type: none"> Biogas produced by one or more anaerobic digesters that is destroyed via flare (combustion device) Must use a post-diversion treatment such as composting

¹⁷ Available from: <https://www.legislation.gov.au/Details/F2020L00005/Supporting%20Material/Text>

Appendix 2: Notification requirements

Table 5: Notification requirements

Event	Notification triggers	Notification deadline
Offsets report events	You identify an error in your offsets report relating to project eligibility or the net abatement amount.	Within 60 days of you becoming aware of the event.
Project participant events	<p>The person running the project (the project participant) changes due to death or other circumstances.</p> <p>The project participant is no longer a fit and proper person, due to insolvency or other events.</p>	Within 90 days of you becoming aware of the event.

Appendix 3: Project variations

Table 6: Project variation actions and requirements

Variation type	Requirements
Vary project participant	The project participant is the person who has the legal right and responsibility for carrying out the project and the right to earn credits. You can add, vary, or remove a project participant. You will need to provide evidence of legal right.
Vary to remove condition	<p>Your project is considered 'conditional' until all consents or approvals are received.</p> <p>You can apply to remove this condition by providing all signed eligible interest-holder consent forms or regulatory approvals through the Project Variation form on the Clean Energy Regulator Client Portal.^{Error! Bookmark not defined.}</p> <p>You will need to provide all eligible interest-holder consents and regulatory approvals before your first offsets report.</p>
Vary project start date	<p>You can vary your project's nominated start date (which is also the start of your crediting period and first reporting period). The varied start date cannot be later than 18 months after the date your project is registered.</p> <p>You can only vary the start date before you submit your first offsets report, and it can only be varied once.</p>

Further information on varying your project can be found on our [making changes to your project webpage](#).